

Support of decision makers on demand-responsive transport (DRT) in rural areas



Digital twin of City Salzgitter-Bad with the open source DLR-Tool SUMO (Simulation of Urban Mobility) Source: DLR

Background & Goals

- DRT serves as a supplement to local public transport in regions with lower demand in terms of time and space. As digitized, flexible public means of transport, it offers high-quality journeys, as it is only bound to fixed (virtual) stops and not to fixed schedules and routes. Highly automated vehicles have particular potential to increase efficiency here.
- In the DLR VMo4Orte project, we are working with our partners in the field to analyze how often and where DRT is preferred. The aim is to achieve high quality with as few vehicles as possible and to transport as many people from A to B as possible. It is intended to make a contribution to attractive and efficient local public transport and thus make transport more climate-friendly.
- In Germany, there are already over 80 such services in urban districts, small towns and rural areas. Most of the services are currently financed by special funding. Public transport authorities face the challenge of being able to finance DRT services in the future.

Research Questions

- How efficient can DRT be in small towns and rural areas compared to motorized private transport and taxi transport?
- Where can DRT be used particularly efficiently, also in order to make the introduction of DRT more sustainable?
- What methodological approach should be used to evaluate DRT in order to be able to present financing options?
- How should the benefits of highly automated public transport be assessed and how can the challenges of introduction and sustainable integration be overcome?

Methodical Approach

- In cooperation with the public transport authority Regionalverband Großraum Braunschweig, DLR analyzed booking data from seven DRT services in the region over two years of operation.
- Using model-based microscopic traffic simulations with the open source DLR tool SUMO, sensitivity analyses on the relationship between demand, transport supply and performance were carried out and evaluated. The DLR simulation models were calibrated on the basis of the demand structure in order to be able to carry out efficiency analyses.

Results & Knowledge Transfer

Results for a successful transfer into practice:

- The efficiency is measured as booking-km per vehicle-km in order to consider the detours correctly.
- DRT services can be up to 1.5 times more efficient than motorized private transport and two times more efficient than taxi transport.
- Efficiency is higher if as many booking requests as possible can be bundled into journeys. The maximum detour factor for route planning should be set at around three.
- In order to avoid long detours, (virtual) stops should not be set up in areas with very low speeds.
- High efficiencies are achieved in larger areas with long routes (e.g. directional public transport in rural areas compared to small, compact towns).
- Efficiency increases if the DRT service is designed to connect important public transport hubs, such as local railway stations and frequently served regional bus stops.
- 25 - 40 % of DRT journeys are used as part of an intermodal travel chain. The efficiency of DRT with these journeys increases by up to 50 %.



Project Partner

Regionalverband Großraum Braunschweig: responsible body for local public transport and regional rail transport in the Braunschweig region



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